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WO 92/21110 A1 WO 88/03294 A1 US 5223699 A

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## (54) Data communication

(57) Business cards are produced having eye-readable data including a personal name, address and telephone number. In addition, machine-readable data, conveyed via a magnetic strip or similar is also provided on the card. A plurality of the cards are supplied to the named individual for distribution to recipients and each recipient is encouraged to apply the card to a card reader (42) arranged to read the machine-readable data from the card. The data read from the card is processed and as a result of this processing, a modem (46) sets up a call to a processing centre (47) via a telephone network (48). In response to contacting the database, the database responds by supplying data back to the recipient's processing device (45) relating to the individual named on the card.

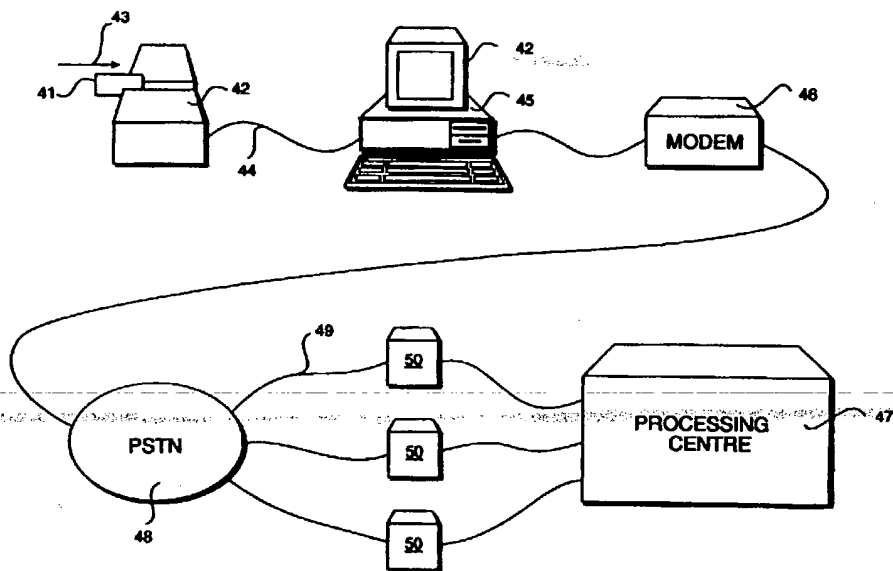
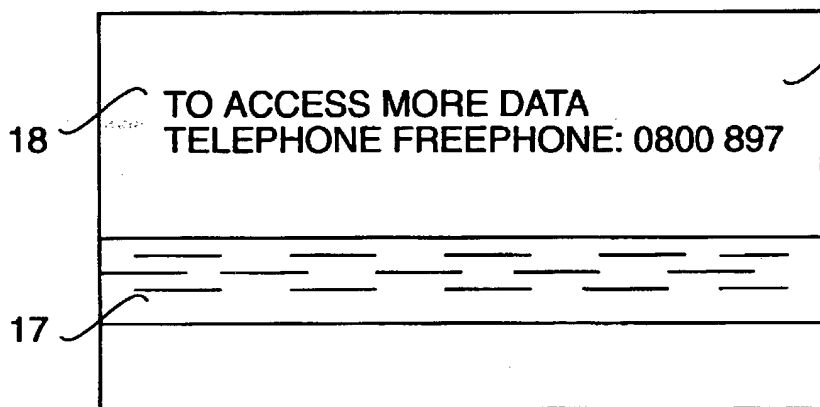


Figure 3

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15



16

18

17

Figure 1

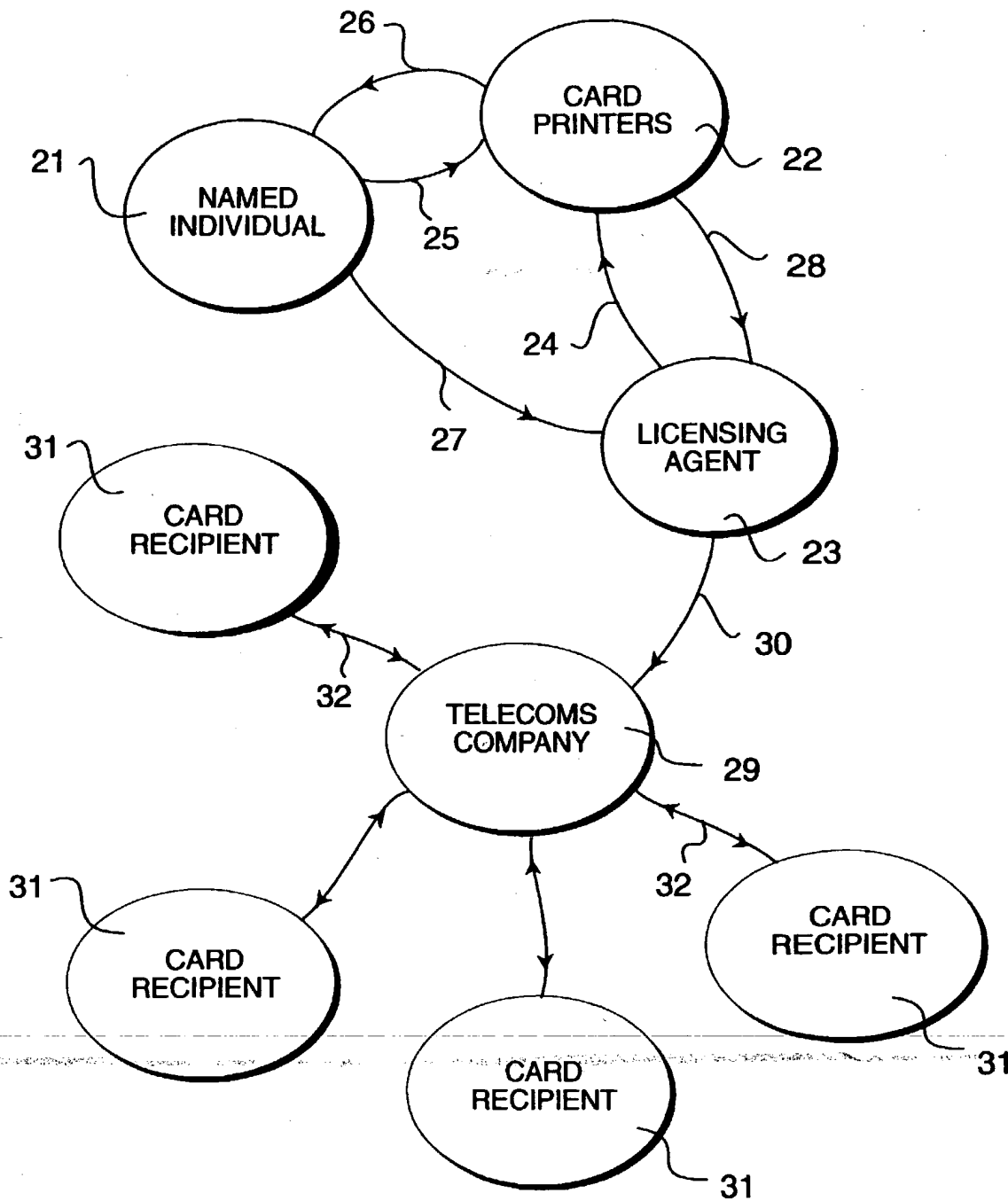


Figure 2

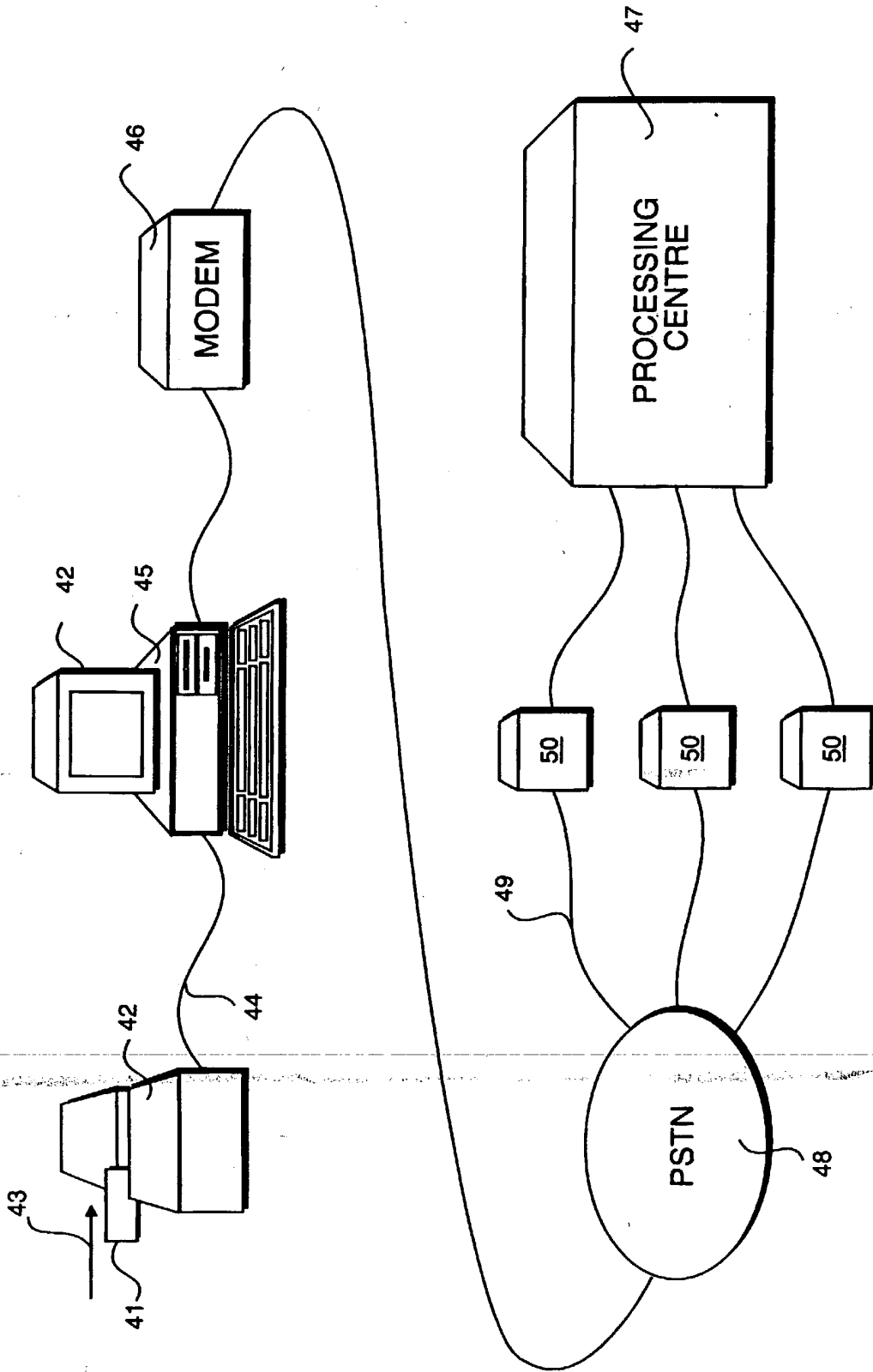


Figure 3

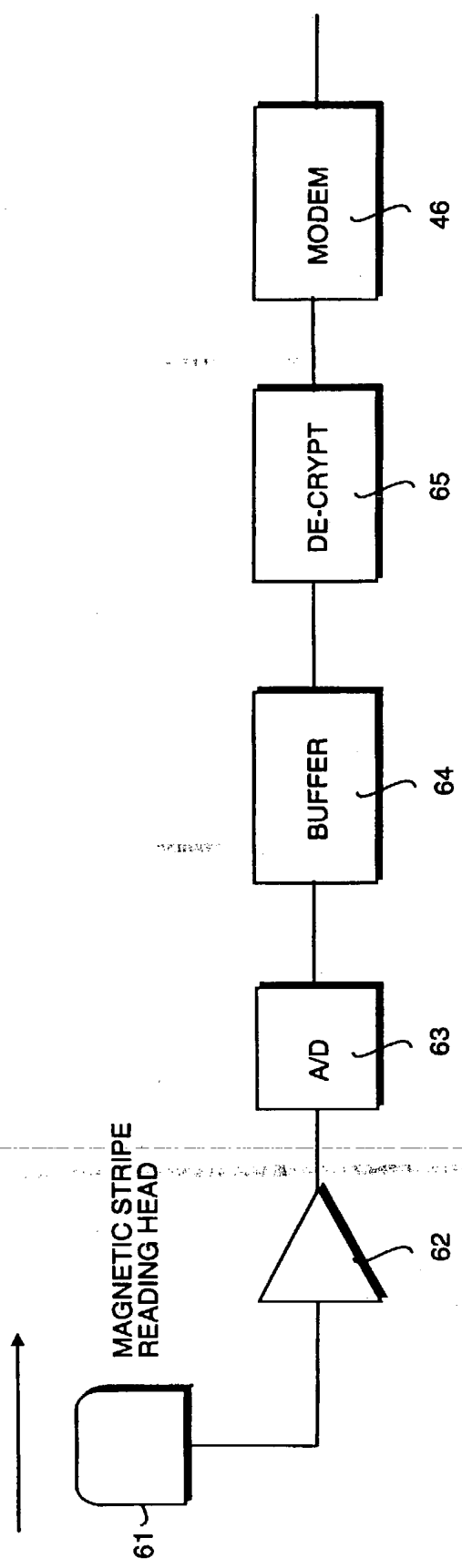


Figure 4

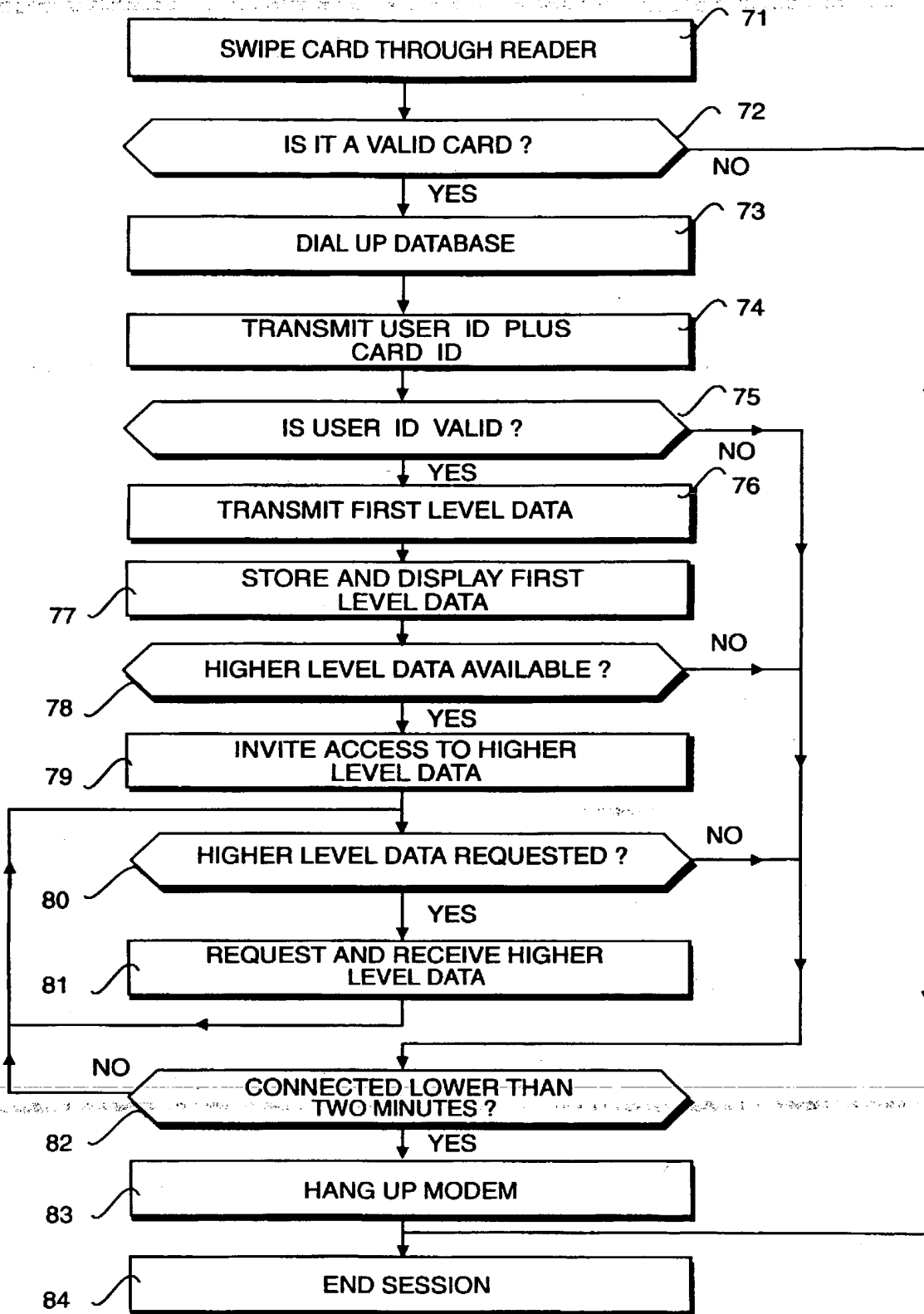


Figure 5

## DATA COMMUNICATION

The present invention relates to data communication. In particular, the present invention relates to data communication as a mechanism for facilitating information to be transmitted using business cards or calling cards.

A composite calling card for social and business data is disclosed in United States Patent No. 4,945,219. The card has eye readable data printed on a paper front, so as to resemble conventional business cards of this type. However, in addition, the card also includes a material for accepting machine readable data. The machine readable data is read by a card reader, decoded by a computer, visually displayed on a cathode ray tube and stored in a data storage device for later retrieval.

In appearance, cards suitable for application with the present invention may be substantially similar to those described in the aforesaid patent. As stated in the aforesaid patent, the business card or calling card (which will be defined herein as a business card) has the outward appearance of a normal business card and, like normal business cards, serves as an introduction in business situations and assists in the establishment of business relations.

It is well known that the use of business cards is well established and a very large number of such cards are passed freely between people during business interactions and also during social interactions. It is usual to include the name of the individual presenting the card along with the name of the company or other entity represented by the individual. As appropriate, addresses and telephone numbers are included and increasingly other numbers are included such as telefax, telex and internet numbers. The card may



include a title or position of the person presenting the card, along with company indications, logos and devices etc. Furthermore, in some situations, key words or phrases may be included relating in some way to the type of business being executed on the part of the company represented by the individual.

Often, business cards are retained and collected, given that a file of such cards provides a convenient and effective way of retaining details of individuals who may be contacted at a later date.

In the aforesaid patent, as previously stated, machine readable data is also included. Given a suitable card reader, recipients of cards may access this machine readable data, such that data obtained from the card is supplied directly to a suitable computer terminal, displayed thereon and saved for subsequent processing. Thus, given a number of these cards, it would be possible for a recipient to build up a database of information without needing to personally key-in the relevant information.

A problem with this known system is that the amount of data available to anyone accessing the machine readable form of said data is limited by the available capacity provided by the machine readable stripe.

A similar system is disclosed in International Publication WO93/04440.

In this system, machine readable data is included on business cards and the quantity of data which may be included on the card is increased by providing eight parallel magnetic stripes. However, again, the amount of data contained is not significantly greater than that contained in eye readable form printed on the card in the normal way. Thus, the use of cards of this type does not

provide a significant advantage over traditional cards, from which information may be keyed by a human operator.

According to a first aspect of the present invention, there is provided a data communication method, comprising steps of: producing business cards  
5 having eye readable data including a personal name, address and telephone number and machine readable data; supplying a plurality of said cards to the aforesaid named individual for distribution to recipients, wherein a recipient of one of said cards supplies said card to reading means arranged to read said machine readable data; and said reading means is arranged to: supply data  
10 read from said card to processing means thereby instructing said processing means to dial up a database; supply data to said dialled up database in response to data read from said card and receive data back from said database relating to said named individual.

The invention will now be described by way of example only, with  
15 reference to the accompanying drawings, in which:

Figure 1 shows a business card capable of displaying eye readable data and machine readable data;

Figure 2 illustrates an environment in which the card shown in Figure  
1 may be used;

20 Figure 3 illustrates equipment for reading machine readable data contained on the card shown in Figure, including a card reader, a personal computer and a modem;

Figure 4 details the card reader and the personal computer shown in Figure 3; and

Figure 5 details the operation of the personal computer shown in Figure 3.

5           A front surface 15 of a business card is shown in Figure 1. A front surface of the card is printed in a substantially similar way to that in which conventional business cards are printed. Thus, the front surface of the card identifies a named individual, who would generally give cards to recipients, the name of the individual's company or organisation, the individual's  
10           position within the company and the company's telephone and fax numbers. Other information, such as logos, devices and details of other modes of communication may be included although, in accordance with the present invention, the need for including this information is reduced. Furthermore, in order to optimise the particular features of the invention, it may be  
15           desirable to restrict the amount of information which is contained in printed form, thereby ensuring that this information does not become outdated or obsolete.

          A rear surface 16 of the card is also shown in Figure 1. The rear surface differs from conventional business cards in that it includes a magnetic  
20           stripe 17, arranged to be encoded so as to convey machine readable data. In addition, the rear surface of the card also includes an eye readable notice 18, identifying a freefone telephone number, or other suitable means of communication, by which a recipient may obtain details as to how said recipient may make use of the machine readable data contained on the card.

An environment under which it is intended that the card would be used is illustrated in Figure 2. A named individual or an organisation with a plurality of individuals, decides to have business cards produced in accordance with the present invention. The individual, represented by numeral 21 in Figure 2, approaches a card printing organisation 22 or similar organisation from whom the cards may be obtained. The card printer 22 has a stock of cards onto which details, similar to those illustrated by a front surface 15, may be printed in a conventional way. Data is pre-loaded onto the magnetic stripe 17 by a licensing agent 23 who is responsible for supplying blank cards to the card printer 22. Thus, blank cards are supplied to the card printer 22 with unique data already encrypted on each batch of cards. Thus, each batch of cards, for example each batch of 1000 cards, has its own unique number and for the system to operate it is only necessary for a central processing centre to identify this unique number. Thus, it is not necessary to encode any data which is specifically relevant to the named individual, given that this data is stored centrally.

A licensing agent 23 supplies batches of blank cards to a plurality of card printers 22, identified graphically by link 24. The named individual 21 supplies basic information to the card printer 22, illustrated by link 25, in substantially the same way in which conventional cards are printed. Thus, the named individual 21 may supply basic alpha numeric details or, alternatively, the named individual may supply complete artwork to the card printer 22, allowing said card printer to print the cards in the normal manner.

The printed cards, along with suitable instructions for completing the process, are supplied by the card printer 22 to the named individual, identified graphically by link 26.

Upon receiving his batch of printed cards, the named individual is also presented with forms, allowing additional information to be recorded. This additional information consists of the information which card recipients may obtain on-line from the processing centre. Once the forms have been completed, they are supplied to the licensing agent 23, represented graphically by link 27. In addition, the card printer 22 will have received payment from the named individual and some of this, along with details to the effect that the transaction has occurred, are transferred by the card printer 22 to the licensing agent 23, represented graphically by link 28.

The licensing agent coordinates the information received from the card printer 22 along with details received from the named individual 21. This information is supplied to a telecommunications company 29, with the transfer being indicated graphically by link 30. The telecommunications company is responsible for providing a database containing information supplied by the named individual by the licensing agent 23. Card recipients 31 are each provided with a suitable reading device for reading the information contained on the card, in addition to telecommunications equipment facilitating connection, via a modem, to the database held by the telecommunications company 29.

Upon swiping received cards through their respective equipment, a connection is established, illustrated by link 32, to the processing centre.

Assuming appropriate licensing fees have been paid, the connection 32 allows information supplied by the named individual, via the licensing agent 23 to be downloaded over links 32 to the card recipient's equipment. In this way, data held by the telecommunications company 25 concerning individuals, their activities, their position within companies and the activities of their companies, may be regularly updated such that, when required, information

supplied to card recipients is fresh and reliable. Thus, a collection of cards may be made over a number of years and card recipients may be assured, subject to licensing arrangements being obtained, that their information is reliable and may be updated. Similarly, if a particular individual leaves a particular firm, an entry may be made on the database to the effect that the individual concerned is no longer responsible for that particular activity and details of a replacement or alternative may be brought to the attention of the calling recipient.

On wishing to obtain information relating to a card, a card recipient swipes the card through a specifically configured card reading machine which in turn accesses data held at the processing centre 29 via a modem link.

In an alternative arrangement, a named individual 21 may obtain printed cards from a card printer 22 in a conventional way, that is to say, the cards are printed without a magnetic stripe. The printed cards are returned to the named individual who then conveys all or some of the cards to a licensing agent 23 or to a card printer 22, whereupon a magnetic stripe is added to the pre-printed cards. On invoking this step, the named individual is supplied with data recording material, allowing the named individual to specify the data which is to be associated with that particular card.

In a preferred configuration, the named individual is supplied with a standard removable diskette containing proformas onto which the data to be recorded by the system is manually added by the named individual. Thus, in this way, the licensing agent is relieved of the task of converting the data into machine-readable form and the onus of ensuring that the data is recorded correctly is placed on the named individual. It is envisaged that named

individuals preferring cards of this type would already have equipment readily available and would themselves prefer adding data to the system in this way.

A further refinement to the system is that any named individual may update stored information at any time. A database of the externally generated and recorded data is retained at a database held by the licensing agent 23, 5 allowing the data to be updated by the licensing agent as soon as it is received from the named individual. Thereafter, on a regular basis, say once a week, the new information retained by the licensing agent 23 may be downloaded to the telecommunications company 29. Thus, without requiring 10 to issue new cards to potential customers etc., the data effectively associated with that card may be regularly updated. Thus, from the card recipient's point of view, a collection of such cards may be retained and the information associated with that card obtained from the database as and when required. In this way, a card recipient may retain specific cards for long periods of time 15 without the cards becoming redundant. Furthermore, even if specific named individuals leave a particular company, their information may be modified, such that a link is provided to another named individual or information is supplied allowing the customer to satisfy a particular request.

It will be appreciated that the data actually stored on the card is in the 20 form of a binary sequence. A coding regime is adopted so as to maximise the amount of information which may be conveyed, such as to maximise the number of named individuals who may employ the service while at the same time providing a sufficient level of error detection and error correction.

The equipment required to effect the communication between the card 25 recipient and the telecommunications company is illustrated in Figure 3. A card 41 is manually swiped through a card reading device 42 in the direction

of arrow 43. In response to the swiping of the card through the card reader information is supplied over a serial RS232 link 44 or a parallel link, to a suitable processing engine 45 which, preferably, may be configured as a UNIX workstation, an IBM compatible personal computer or a Macintosh computer.

Operation of the card reader 42, along with communication to the computer 45 and a modem 46, is controlled via instructions executed by the computer 45. Thus, a program is loaded into the computer 45 which, once executed, enters a state under which a card may be swiped through the card reader. After a card has been swiped, resulting in information being transmitted over the serial link 44, the instructions are arranged to generate suitable signals for application to the modem 46. The modem 46 is arranged to dial up a central processing centre 47, via the public switch telephone network (PSTN) 48. The PSTN 48 provides a telephone line connection 49 to the central processing centre 47 which communicate with said centre via respective modems 50.

Thus, a procedure is instigated by a card 41 being swiped through the reader 42. In response to information received over link 44, processor 45 initiates a call to the central processing centre 47 via the PSTN 48 and terminal modems 46 and 50. The central processing centre 47 analyses the information received from the processing unit 45 and returns first level information back to the processing unit via modem 50, PSTN 48 and modem 46. This information is stored locally by the processor 45 and displayed on a visual display unit 51. At this point, a user may request additional information to be supplied from the central processing centre or, alternatively, after a predetermined time out period, the communication link is disconnected by modem 46 hanging up.



The card reading device 42 and aspects of the processing computer 45 are detailed in Figure 4. As the card 41 is swiped through the reader 42 a magnetic stripe is moved past a magnetic head 61. Magnetic head 61 converts the changing magnetic field passing thereby, into an electrical signal which is amplified by a suitable buffering amplifier 62. The output for the buffering amplifier 62 is shaped-up into a digital signal by means of an analog to digital clock or slicer 63, which supplies a sequence of ones and zeros to a clocked buffer 64.

The clocked buffer 64 is written to under the control of the control processor 45, which is arranged to identify patterns representing a start and an end of a data block. Once loaded to the buffer 64, the data may be analysed in the form of a two dimensional array. Thus, error detection and correction codes may be implemented, so as to detect when erroneous data has been read by the card reader 42 and, when a small number of errors are present, possibly correct said errors.

Thereafter, the data stored in the clocked buffer 64 is decrypted by a decryption process 65. The decryption may consist of looking at patterns in the two dimensional array of data in order to determine the nature of the unique identification code stored therein. In addition to providing a unique identification code, a further level of redundancy is provided, so that only codes encrypted in a particular way will be considered as valid. The important aspect of this encoding is to ensure that all valid data has been encoded in a particular way, such that invalid data cards, i.e. those not supplied by an authorised licensing agent, do not result in the system providing access to the central processing centre 47.

After suitable decryption by the decryption circuit 65, data signals are supplied to the modem 46, thereby facilitating communication with the central processing centre 47.

Procedures executed by the system are detailed in Figure 5. At step  
5 71 the card is swiped through the card reader and at step 72 a question is asked as to whether a valid card has been swiped therethrough. If this question is answered in the negative, control is directed to step 84 and the session is terminated. Thus, the control processor 45 may generate signals displayable on the VDU to the effect that the card is invalid and the user may  
10 then be prompted to swipe a new card.

If a valid card is swiped through the reader, resulting in the question asked at step 72 being answered in the affirmative, the database, via modems 46 and 50 and the public switch telephone network is dialled up at step 73.

After a connection has been made to the database held at processing  
15 centre 47, data is transmitted over the telephone network 48 via the cooperating modems. The data, which again may include suitable data correction coding in accordance with established techniques, defines the unique card identification read from the magnetic stripe. In addition, the transmitted information also indicates a unique identification for the  
20 requesting card recipient. The central control centre is aware of the telephone number of the calling card recipient and it is possible for this telephone number to be compared against the user's identification. As a result of this comparison, the central processing centre 47 asks a question at step 75 as to whether the user identification is valid. If the user identification is not valid,  
25 for example because the user is not using an allocated telephone number or if appropriate licensing charges have not been satisfied, the question asked at

step 75 is answered in the negative, data to this effect is transmitted back to the card recipient's processor 45 which, in accordance with steps 82, 83 and 84, results in the modem being hung up, after a suitable time interval, and the session ending.

5           If the user ID is valid, resulting in the question asked at step 75 being answered in the affirmative, the processing centre 47 is arranged to transmit first level data to the calling card recipient at step 76. This first level data may include data substantially similar to that contained on the printed card itself. However, as changes occur, this data may be updated, to reflect  
10 changes in the position of the named individual or changes within the organisation represented by the individual. Thus, although the information provided at the first level may be of substantially similar nature to that contained on the printed card itself, at least this information will be updated, unlike the printed eye readable version.

15           The data is received by the recipient's processing unit 45, resulting in said information being locally stored at step 77 and displayed on the display unit 51.

          In addition to the first level data being supplied back to the requesting card recipient, an indication is also provided relating to the nature of  
20 additional information which may be available. An indication to the effect that additional information is available will be supplied if two conditions are satisfied. Firstly, the information must be available in terms of being stored at the central processing centre, so that it may physically be transmitted to the card recipient. Secondly, the central processing centre 47 is also capable of  
25 determining whether the card recipient has paid suitable licensing fees, thereby enabling said recipient to be given access to this higher level

information. Thus, if these conditions are satisfied, information to the effect that higher level information is available is supplied back to the calling recipient and displayed on the display unit 51 in a suitable way.

5 If higher level data is not available, the question asked at step 78 is answered in the negative and control is directed to step 82. At step 82 a question is asked as to whether the connection has been established for two minutes and if answered in the negative control is returned to step 80. Under these circumstances, although a question is asked at step 80 as to whether higher level data has been requested, this question will always be answered  
10 in the negative because no such data is available. Thus, thereafter, control is directed back to step 82 and eventually the question asked at step 82 will be answered in the affirmative, resulting in the modem hanging up at step 83 and the session ending at step 84.

15 If the question asked at step 78 is answered in the affirmative, to the effect that data is available, the card recipient is invited to access the available higher level data and at step 80 a question is asked as to whether the higher level data has been requested. As previously stated, if this question is answered in the negative, control is directed to step 82, whereafter, when connected for more than two minutes, the modem hangs up at step 83 and the  
20 session ends at step 84.

If higher level data is requested, resulting in the question asked at step 80 being answered in the affirmative, control is directed to step 81 and a request is made to receive higher level data which is then automatically returned by the central processing centre 47. Thereafter, control is returned  
25 to step 80 where once again higher level data may be requested. Having obtained all the higher level data that a calling card recipient requires, the

question asked at step 80 will be answered in the negative, resulting in control being directed to step 82.

If higher level data has been requested, it is likely that the connection will have been established for more than two minutes, resulting in the question asked at step 82 being answered in the affirmative, the modem hanging up at step 83 and the session ending at step 84.

In a preferred embodiment, first level data will be more detailed than that available from the printed side of the card. In order that the data may be interpreted by the receiving processor, it is stored in a predetermined format. For example, the format may comprise company name, location address, postal address, contact, title, department, switchboard telephone number, direct dial telephone number, SIC code, company function, list of products and services. Thus, it can readily be appreciated that the amount of information which may be supplied, even at the first level, far exceeds that which could possibly be included solely on the magnetic stripe.

In addition to the first level information, level two information may be obtained and level three information may also be obtained. Level two information consists of information defining company size, partners, qualifications, quality assurance including data certification, graphical map and nearest stations and transport. Similarly, level three information may include substantially larger amounts of detail including case studies and a full company profile.

It is envisaged that most of the information transmitted using the system will be text data. However, in particular applications, it is possible

for other types of data to be transmitted, such as audio soundtracks, computer programs or compressed video data.

5 In the preferred embodiment, machine readable data is stored via a magnetic stripe. However, it should be appreciated that other forms of machine readable data may be used, such as bar codes or other optical arrangements.

10 In the preferred embodiment, it is envisaged that communication will be made via conventional physical telecommunications channels. However, in an alternative embodiment, a mobile arrangement may be configured to use a cellular telephone link. Thus, a portable card reader may be connected to a lap top computer which in turn may communicate via a modem and a GSM digital portable telephone operating in data transmission mode.

**CLAIMS**

1. A data communication method, comprising steps of:  
producing business cards having eye readable data including a personal  
name, address and telephone number and machine readable data;  
5 supplying a plurality of said cards to the aforesaid named individual  
for distribution to recipients, wherein a recipient of one of said cards supplies  
said card to reading means arranged to read said machine readable data; and  
said reading means is arranged to:  
supply data read from said card to processing means thereby instructing  
10 said processing means to dial up a database;  
supply data to said dialled up database in response to data read from  
said card and receive data back from said database relating to said named  
individual.
- 15 2. A method according to claim 1, wherein the database  
immediately supplies first level information back to the processing means.
3. A method according to claim 1 or claim 2, wherein second level  
information is suppliable back to the processing means in response to a  
request made by said recipient.
- 20 4. A method according to any of claims 1 to 3, wherein data read  
from a card is encrypted and decryption is performed by said processing  
means, such that only appropriately encrypted data results in a call being  
made to the database.
5. A method according to any of claims 1 to 4, wherein data  
supplied to said database is coded, so as to identify the requesting party.

6. A data communication method, using:

at least one business card, said business card having thereon eye-readable data, including a personal name, address and telephone number, and machine readable data; and

5 a system having reading means capable of reading said machine readable data, data processing means, display means and means for accessing a remote database; said method comprising steps of:

causing said reading means to read said machine readable data by applying said business card to said reading means; whereafter:

10 said reading means supplies data to said processing means which in turn supplies data to said remote database; and

said remote database supplies data back to said processing means relating to the person identified on the business card.

7. A method according to claim 6, wherein the database  
15 immediately supplies first level information back to the processing means.

8. A method according to claim 6 or claim 7, wherein second level information is suppliable back to the processing means in response to a request made by said recipient.

9. A method according to any of claims 6 to 8, wherein data read  
20 from a card is encrypted and decryption is performed by said processing means, such that only appropriately encrypted data results in a call being made to the database.

10. A method according to any of claims 6 to 9, wherein data supplied to the database is coded, so as to identify the requesting party.



11. Apparatus for data communication, comprising  
a plurality of business cards, wherein each of said business cards  
includes eye-readable data specifying a personal name, address and telephone  
number;

5 each of said business cards includes machine-readable data;  
means for reading said machine-readable data by the manual  
application of a business card;

data processing means arranged to receive data from said data reading  
means, including means for accessing a remote database; and

10 a remote database arranged to supply data back to said processing  
means, wherein said returned data relates to the named person identified on  
the respective business card.

12. Apparatus according to claim 11, wherein said database is  
arranged to supply first level information back to the requesting processing  
15 means.

13. Apparatus according to claim 11 or claim 12, wherein said  
database is arranged to supply second level information back to the processing  
means in response to a request.

14. Apparatus according to any of claims 11 to 13, wherein said  
20 processing means includes decryption means arranged to decrypt appropriately  
encrypted machine-readable data stored on the database.

15. Apparatus according to any of claims 11 to 14, wherein said  
processing means includes means for coding data supplied to the database, so  
as to identify the requesting party.

16. A data communication method substantially as herein described with reference to Figure 2 and Figure 3.

17. A data communication apparatus substantially as herein described with reference to Figures 3, 4 and 5,

5 a business card including machine-readable data substantially as herein described with reference to Figure 1, arranged to operate as part of a method according to claim 16 or in association with an apparatus according to claim 17.

**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

**Application number**  
**GB 9424932.3**

### Relevant Technical Fields

(i) UK Cl (Ed.N)      H4K: KOD4; KOD6; KOT

(ii) Int Cl (Ed.6) H04M

### Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

**(ii) ONLINE: WPI**

**Search Examiner**  
**AL STRAYTON**

**Date of completion of Search**  
**2 MARCH 1994**

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Category	Identity of document and relevant passages	Relevant to claim(s)
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A	WO 88/03294 A1 (CALL-IT)	
A	US 5223699 (FLYNN)	

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